

REMARKS

Prior to entry of this Amendment, claims 1-20 are pending in the application. Claims 1, 15 and 20 are independent.

By this Amendment, applicants amend the Abstract of the Disclosure and claims 1, 15-18 and 20. Applicants respectfully submit that no new matter has been added.

Applicants respectfully request favorable reconsideration of claims 1-20 based on the following remarks and arguments.

A. Introduction

In the outstanding, non-final Office action, the Examiner objected to the Abstract of the Disclosure; rejected claims 1, 6-10 and 13-20 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,474,783 to Pilosof et al. ("the Pilosof et al. reference"); rejected claims 2-5 under 35 U.S.C. § 103(a) as being unpatentable over the Pilosof et al. reference in view of U.S. Patent No. 5,713,673 to Nemeto et al. ("the Nemeto et al. reference"); and rejected claims 11 and 12 under 35 U.S.C. § 103(a) as being unpatentable over the Pilosof et al. reference in view of U.S. Patent No. 6,582,058 to Yi et al. ("the Yi et al. reference").

B. Objection to the Specification

In the outstanding, non-final Office action, the Examiner objected to the Abstract of the Disclosure because it includes legal phraseology, such as "means."

Applicants amend the Abstract of the Disclosure and remove the term "means."
Applicants respectfully submit that the Abstract of the Disclosure complies with MPEP §608.01(b)(C) and request that the objection to the Abstract of the Disclosure be withdrawn.

C. Asserted Anticipation Rejection of Claims 1, 6-10 and 13-20

In the outstanding, non-final Office action, the Examiner rejected claims 1, 6-10 and 13-20 under 35 U.S.C. § 102(b) as being anticipated by the Pilosof et al. reference. Applicants amend claims 1, 15 and 20 to more clearly recite the present invention. Applicants respectfully submit that these claims are allowable over the Pilosof et al. reference for at least the following reasons.

The Pilosof et al. reference fails to disclose or suggest, *inter alia*, irradiating a laser beam directly onto ink to generate a pressurized wave in the ink, as applied to claims 1 and 15, or controllably energizing ink in an ink chamber to generate a pressurized wave before the ink reaches a boiling state by limiting an amount of energy being supplied directly to the ink, as applied to claim 20.

Claim 1 is directed to an ink-jet printhead including, *inter alia*, a laser beam irradiating means for irradiating a laser beam directly onto the ink, wherein a surface of the ink is vibrated by a pressurized wave generated by the laser beam. The grounds of rejection advance that the laser source 10 in FIG. 2B of the Pilosof et al. reference corresponds to the laser beam irradiating means for irradiating a laser beam on ink, wherein a surface of the ink is vibrated by a pressurized wave generated by the laser beam. Applicants respectfully disagree.

The Pilosof et al. reference discloses that “[t]he laser light pulse passes through the window 24 and is absorbed by the buffer liquid 34 in the buffer liquid chamber 26. The temperature and pressure of the buffer liquid 34 in the light pulse rise quickly, creating an acoustic wave. The acoustic wave propagates in the buffer liquid 34, crosses the intermediate body 28, and enters the ink chamber 30” (col. 5, lines 48-54; *see also* col. 6, lines 42-56). FIG. 3 of the Pilosof et al. reference illustrates the window 24, the buffer liquid chamber 26 and the intermediate body 28 of the printhead 16. As illustrated in FIG. 3, the Pilosof et al. reference

discloses that the “intermediate chamber body 28 separates the buffer liquid chamber 26 from the ink chamber 30” (col. 5, lines, 32-34).

Applicants respectfully submit that the Pilosof et al. reference does not disclose or suggest that the modulated light from the laser 10, allegedly corresponding to the laser beam of the ink-jet printhead of claim 1, irradiates *directly onto the ink* contained in the ink chamber to generate a pressurized wave (*emphasis added*). Rather, the Pilosof et al. reference explicitly discloses that the modulated light from the laser 10 irradiates *onto the buffer liquid 34* to create an acoustic wave. The acoustic wave generated in the buffer chamber 26 must cross the intermediate body 28 and enter the ink chamber 30 (*emphasis added*). In this regard, the Pilosof et al. reference simply does not disclose or suggest that the modulated light from the laser 10 irradiates directly onto the ink.

Applicants respectfully note that the Pilosof et al. reference discloses that the buffer liquid 34 “is preferably characterized by very high absorption for laser light” (col. 5, lines 36-38). Additionally, from an obvious standard, the Pilosof et al. reference teaches away from any printhead that heats the ink directly or indirectly (FIG. 3; *see also* col. 1, lines 65-67; col. 2, line 6). That is, the Pilosof et al. reference teaches heating a buffer liquid 34 and discloses “[t]he heated buffer liquid 34 is constantly replaced by cooled buffer liquid 34, so that the heat generated by the light absorption is carried away from the ink chamber 26 and is absorbed by the cooling element 22” (col. 5, lines 57-61).

For at least these reasons, applicants respectfully submit that the print head 16 of the Pilosof et al. reference fails to correspond to, disclose or suggest, the ink-jet printhead including, *inter alia*, a laser beam irradiating means for irradiating a laser beam directly onto ink, wherein a surface of the ink is vibrated by a pressurized wave generated by the laser beam, as claimed in claim 1. For at least these reasons, the grounds of rejection do not establish a *prima*

facie case of anticipation, or in the alternative, a *prima facie* case of obviousness. Accordingly, applicants respectfully request that the rejection of claim 1 under 35 U.S.C. § 102(b) be withdrawn. Since claims 6-10, 13, 14 and 19 are patentable at least by virtue of their dependency on claim 1, applicants respectfully request that the rejection of claims 6-10, 13, 14 and 19 under 35 U.S.C. § 102(b) also be withdrawn.

Claim 15 is directed to a method of expelling ink including, *inter alia*, irradiating a laser beam directly onto the ink contained in the ink chamber to generate a pressurized wave in the ink. For at least the reasons analogous to those discussed above in regard to claim 1, the Pilossof et al. reference fails to disclose or suggest the irradiating step, as well as the remaining step of a method of expelling ink as claimed in claim 15. For at least these reasons, the grounds of rejection do not establish a *prima facie* case of anticipation, or in the alternative, a *prima facie* case of obviousness for claim 15. Accordingly, applicants respectfully request that the rejection of claim 15 under 35 U.S.C. § 102(b) be withdrawn. Since claims 16-18 are at least patentable by virtue of their dependency on claim 15, applicants respectfully request that the rejection of claims 16-18 under 35 U.S.C. § 102(b) also be withdrawn.

Claim 20 is directed to a method of controllably expelling ink including, *inter alia*, controllably energizing ink in an ink chamber to generate a pressurized wave...before the ink reaches a boiling state by limiting an amount of energy being supplied directly to the ink. For at least the reasons analogous to those discussed above in regard to claim 1, the Pilossof et al. reference fails to disclose or suggest the controllably energizing step, as well as the remaining step of a method of controllably expelling ink as claimed in claim 20. For at least these reasons, the grounds of rejection do not establish a *prima facie* case of anticipation, or in the alternative, a *prima facie* case of obviousness for claim 20. Accordingly, applicants respectfully request that the rejection of claim 20 under 35 U.S.C. § 102(b) be withdrawn.

D. Asserted Obviousness Rejection of Claims 2-5

In the outstanding, non-final Office action, the Examiner rejected claims 2-5 under 35 U.S.C. § 103(a) as being unpatentable over the Pilossof et al. reference in view of the Nemeto et al. reference. Applicants respectfully traverse this rejection for at least the following reasons.

As discussed above in section C, the Pilossof et al. reference fails to disclose or suggest the ink-jet printhead as claimed in claim 1. Applicants respectfully submit that the Nemeto et al. reference fails to compensate for the deficiencies of the Pilossof et al. reference as applied to claim 1.

Accordingly, applicants respectfully submit that the Pilossof et al. reference and the Nemeto et al. reference, individually or in combination, fail to disclose or suggest the ink-jet printhead as claimed in claim 1. For at least these reasons, the grounds of rejection fail to establish a *prima facie* case of obviousness for claim 1.

Since claims 2-5 are patentable at least by virtue of their dependency on claim 1, applicants respectfully request that the rejection of claims 2-5 under 35 U.S.C. § 103(a) be withdrawn.

E. Asserted Obviousness Rejection of Claims 11 and 12

In the outstanding, non-final Office action, the Examiner rejected claims 11 and 12 under 35 U.S.C. § 103(a) as being unpatentable over the Pilossof et al. reference in view of the Yi et al. reference. Applicants respectfully traverse this rejection for at least the following reasons.

As discussed above in section C, the Pilossof et al. reference fails to disclose or suggest the ink-jet printhead as claimed in claim 1. Applicants respectfully submit that the Yi et al. reference fails to compensate for the deficiencies of the Pilossof et al. reference as applied to claim 1.

Accordingly, applicants respectfully submit that the Pilosof et al. reference and the Yi et al. reference, individually or in combination, fail to disclose or suggest the ink-jet printhead as claimed in claim 1. For at least these reasons, the grounds of rejection fail to establish a *prima facie* case of obviousness for claim 1.

Since claims 11 and 12 are patentable at least by virtue of their dependency on claim 1, applicants respectfully request that the rejection of claims 11 and 12 under 35 U.S.C. § 103(a) be withdrawn.

F. Conclusion

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing amendments and remarks, favorable reconsideration of claims 1-20 of this application is earnestly solicited, and an early and favorable further action upon this application is hereby requested.

Respectfully submitted,

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